

REMARKS/ARGUMENTS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested. Claims 1-8, 12-21, and 24-32 are pending.

Claim 1 stands rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0056006 to Jones et al. ("Jones") in view of U.S. Patent No. 7,044,634 to Sandvoss ("Sandvoss"), and U.S. Patent No. 4,083,223 to Hashimoto et al. ("Hashimoto"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

The M.P.E.P. sets forth the criteria for a rejection for obviousness under 35 U.S.C. §103 as follows:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

See, M.P.E.P. § 706.02(j) *citing In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The proposed combination of Jones, Sandvoss, and Hashimoto does not teach or suggest all of the claim limitations in claim 1. Neither Jones, nor Sandvoss, nor Hashimoto taken alone or in combination disclose or suggest obtaining a thermal image as the weld is being formed. Jones merely discloses a method of forming a weld between workpieces 1, 2 over a joint region 3. Jones does not teach obtaining

a thermal image of the weld, as also admitted by the Examiner, let alone obtaining a thermal image as the weld is being formed.

Sandvoss discloses a method and a device 1 for testing materials by determining and displaying as an image temperature differences above a threshold value on the surface of test objects 8, such as weld seams (see abstract). In a first step, a camera for determining and displaying as an image the temperature differences above a threshold value is used to determine the temperatures of object elements 22 within a test area 14 of the test object 8 facing the camera. The test area 14 is then provided with heat by beam 4 in such a manner that the temperature of the surface of the test object 8 rises in the test area 14 by at least the threshold value. The object elements 22 are displayed as image elements in such a manner that the temperature differences above the threshold value between the object elements 22 are visible. The cool-down of the test area 14 is indicated by means of the image elements 20. Sandvoss merely discloses the testing of weld seams or weld points after the weld has been formed (see Col. 4, lines 35-50). Sandvoss fails to disclose or suggest obtaining a thermal image as the weld is being formed.

Hashimoto discloses a thermal test method for nondestructive inspection of the quality of welds formed by spot welding (col. 1, lines 7-10). This inspection is done by heating or cooling one of the welded members and measuring the distribution of the surface temperature of the other member because of a maximal heat conduction at each nugget (see abstract). Hashimoto fails to disclose or suggest obtaining a thermal image as the weld is being formed.

Thus, the combination of Jones, Sandvoss, and Hashimoto fails to teach or suggest all of the claim limitations of claim 1 and thus fails to establish a prima facie case of obviousness.

Further, there is no suggestion or motivation in Jones, Sandvoss, or Hashimoto or in the knowledge of one of ordinary skill in the art to combine the reference teachings of Jones, Sandvoss, and Hashimoto as proposed in the rejection of claim 1. Regarding the combination of Jones and Sandvoss, the Office Action states that it would be obvious to one of ordinary skill in the art at the time of the invention to modify the IR thermal data means, disclosed by Jones, so as to have a thermal image means, in order to enable the operator to obtain a visual data of the weld by collecting the thermal radiation through the second piece, as taught by Sandvoss, so as to provide the operator with a visual thermal data which could allow to immediately see defects and lack of integrity of the weld, in order to take necessary action. The office action then merely concludes that "Therefore, it would have been obvious.... to modify the device, disclosed by Jones, so as to simultaneously heat and obtain an image, as taught by Sandvoss, so as to allow the operator in real time analyze the image and take immediate action simultaneously with heating the weld and thus, to avoid enhancing the defect in the weld by a possible over heating". However, this is speculative. One of ordinary skill in the art will recognize that there is no need to modify Jones as taught in the manner shown in Sandvoss and further to modify Jones to obtain a thermal image as a weld is being formed .

The thermography method of Sandvoss is specifically related to testing test object elements after the object is formed. For example, Sandvoss states that this

method is suitable for checking boat hulls made of glass-fiber plastic to see if salt or fresh water ingressed or penetrated into the laminate resulting in delamination. Sandvoss's thermography method may be used for checking metal spot weld seams and also for checking identification marks on cars or for invisible repairs on the cars covered by paint. Sandvoss further states that it is particularly advantageous to record said test object at first its original state followed by its heating and cooling-down of the test object as a consecutive sequence like a video film by means of said thermographic camera 10. Regarding Jones, Jones does not teach obtaining a thermal image of the weld let alone obtain a thermal image as the weld is being formed. One of ordinary skill in the art would not find it desirable to combine the teachings of Jones and Sandvoss.

Regarding the combination of Jones and Sandvoss with Hashimoto, the office action states that it would be obvious "to add a control device with a feedback to the device, disclosed by Jones, so as to allow the operator to control defects, lack of integrity of the weld caused by improper welding process/improper heating by controlling the weld temperature within predetermined (desired standard) limits". One of ordinary skill in the art will recognize that there is no need to modify Jones as taught in the manner shown in Hashimoto. In fact, Hashimoto is directed to a control circuit 42 configured for varying a welding condition for a spot welding machine 20, not a laser welding apparatus like that of Jones. In particular, Hashimoto discloses a temperature distribution measuring instrument 24 that measures the surface temperature distribution of the welded product and transmits its output to both a monitoring instrument 26 and a data processor. The data processor 28 and a reference circuit 32 are connected to a comparison circuit 30 (see col. 3 lines 47-60).

The comparison circuit 30 communicates with the control circuit 42 to vary the welding condition for the spot welding machine 20, if a measured weld nugget size is smaller than the critical value (see col. 4, lines 24-33). Thus, the teachings of the Jones, Sandvoss, and Hashimoto references are not sufficient to render claim 1 *prima facie* obvious.

It is respectfully suggested that the combination of Jones, Sandvoss, and Hashimoto only seems plausible after having the benefit of the Applicants' disclosure. The use of the teachings of the present invention to find obviousness is impermissible.

The court must be ever alert not to read obviousness into an invention on the basis of applicant's own statements; that is, we must view the prior art without reading into that art applicant's teachings. The issue, then, is whether the teachings of the prior art would, in and of themselves and without the benefits of appellant's disclosure, make the invention as a whole obvious.

In Re Spinnoble, 160 USPQ 237 at 243 (CCPA 1969) (emphasis in original).

Without the teachings of the present invention, one of ordinary skill in the art would not even consider combining the teachings of Jones, Sandvoss, and Hashimoto. Jones does not teach obtaining a thermal image of the weld let alone obtaining a thermal image as the weld is being formed. Sandvoss merely discloses the testing of weld seams or weld points after the weld has been formed. Hashimoto also discloses a thermal test method for nondestructive inspection of the quality of welds formed by spot welding. Accordingly, it appears the Examiner is using the teachings of the present invention to combine the teachings of Jones, Sandvoss, and Hashimoto, which is impermissible. Therefore, in view of the above-mentioned reasons, claim 1 is allowable. Claims 2-8, 12, 25, 26, and 29-32, which depend

directly or indirectly from claim 1, are allowable as depending from an allowable claim and also for the specific limitations recited therein.

Claim 27, which depends from claim 25, should be allowed for the same reasons as claim 25 and also for the feature that the modifying is performed by moving the laser beam over the path at different speeds. None of the cited references disclose or suggest this feature and including all of the limitations of claim 25. Further, the Office Action failed to give a reason for the rejection of claim 27. Thus, claim 27 is allowable.

Claim 28, which depends from claim 1, should be allowed for the same reasons as claim 1 and also for the feature that the step of obtaining the thermal image as the weld is being formed does not include collecting the wavelength of the laser beam used to heat the first and second pieces of plastic material at their location of abutment. None of the cited references disclose or suggest this feature and including all of the limitations of claim 1. Thus, claim 28 is allowable.

Claim 13 stands rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2004/0056006 to Jones et al. ("Jones") in view of U.S. Patent No. 7,044,634 to Sandvoss ("Sandvoss"), and U.S. Patent No. 4,083,223 to Hashimoto et al. ("Hashimoto"). Withdrawal of this rejection is respectfully requested for at least the following reasons.

The proposed combination of Jones, Sandvoss, and Hashimoto does not teach or suggest all of the claim limitations in claim 13. Neither Jones, nor Sandvoss, nor Hashimoto taken alone or in combination disclose or suggest obtaining a thermal image as the weld is being formed. Jones merely discloses a method of forming a weld between workpieces 1, 2 over a joint region 3. Jones does

not teach obtaining a thermal image of the weld, as also admitted by the Examiner, let alone obtaining a thermal image as the weld is being formed.

Sandvoss discloses a method and a device 1 for testing materials by determining and displaying as an image temperature differences above a threshold value on the surface of test objects 8, such as weld seams (see abstract). In a first step, a camera for determining and displaying as an image the temperature differences above a threshold value is used to determine the temperatures of object elements 22 within a test area 14 of the test object 8 facing the camera. The test area 14 is then provided with heat by beam 4 in such a manner that the temperature of the surface of the test object 8 rises in the test area 14 by at least the threshold value. The object elements 22 are displayed as image elements in such a manner that the temperature differences above the threshold value between the object elements 22 are visible. The cool-down of the test area 14 is indicated by means of the image elements 20. Sandvoss merely discloses the testing of weld seams or weld points after the weld has been formed (see Col. 4, lines 35-50). Sandvoss fails to disclose or suggest obtaining a thermal image as the weld is being formed.

Hashimoto also discloses a thermal test method for nondestructive inspection of the quality of welds formed by spot welding (col. 1, lines 7-10). This inspection is done by heating or cooling one of the welded members and measuring the distribution of the surface temperature of the other member because of a maximal heat conduction at each nugget (see abstract). Hashimoto fails to disclose or suggest obtaining a thermal image as the weld is being formed.

Further, neither Jones, nor Sandvoss, nor Hashimoto taken alone or in combination disclose or suggest heating first and second plastic pieces at their

location of abutment by directing the laser beam over the path of a weld pool multiple times. Jones merely discloses that the joint region 3 of the two plastic workpieces 1, 2 is welded by exposing the joint region 3 to a beam of non visible radiation 4 from a source such as a laser 5, an i.r. lamp or the like (see paragraph [32]). Jones fails to disclose or suggest directing a laser beam over the path of a weld pool multiple times. Sandvoss merely disclose that the laser beam may be guided on a meander path across the test area while observing the outer borders of the test area so precisely that a sharp borderline with the not actively heated adjacent area is achieved (Col.3, lines 1-4). Sandvoss fails to disclose or suggest directing a laser beam over the path of a weld pool multiple times. Hashimoto merely discloses joining two steel sheets 10 by spot welding (Col. 2, lines 19-20). Hashimoto fails to disclose or suggest heating the first and second plastic pieces at their location of abutment by directing the laser beam over the path of a weld pool multiple times.

Thus, the combination of Jones, Sandvoss, and Hashimoto fails to teach or suggest all of the claim limitations of claim 13 and thus fails to establish a prima facie case of obviousness.

Further, there is no suggestion or motivation in Jones, Sandvoss, or Hashimoto or in the knowledge of one of ordinary skill in the art to combine the reference teachings of Jones, Sandvoss, and Hashimoto as proposed in the rejection of claim 13. The Office action fails to provide any suggestion or motivation to combine the reference teachings of Jones, Sandvoss, or Hashimoto. Therefore, the Office Action fails to establish a prima facie case of obviousness.

Further, regarding the combination of Jones and Sandvoss, the Office Action states that it would be obvious to one of ordinary skill in the art at the time of the

invention to modify the IR thermal data means, disclosed by Jones, so as to have a thermal image means, in order to enable the operator to obtain a visual data of the weld by collecting the thermal radiation through the second piece, as taught by Sandvoss, so as to provide the operator with a visual thermal data which could allow to immediately see defects and lack of integrity of the weld, in order to take necessary action. The office action then merely concludes that "Therefore, it would have been obvious.... to modify the device, disclosed by Jones, so as to simultaneously heat and obtain an image, as taught by Sandvoss, so as to allow the operator in real time analyze the image and take immediate action simultaneously with heating the weld and thus, to avoid enhancing the defect in the weld by a possible over heating". However, this is speculative. One of ordinary skill in the art will recognize that there is no need to modify Jones as taught in the manner shown in Sandvoss and further to modify Jones to obtain a thermal image as a weld is being formed .

The thermography method of Sandvoss is specifically related to testing test object elements after the object is formed. For example, Sandvoss states that this method is suitable for checking boat hulls made of glass-fiber plastic to see if salt or fresh water ingressed or penetrated into the laminate resulting in delamination. Sandvoss' thermography method may be used for checking metal spot weld seams and also for checking identification marks on cars or for invisible repairs on the cars covered by paint. Sandvoss further states that it is particularly advantageous to record said test object at first its original state followed by its heating and cooling-down of the test object as a consecutive sequence like a video film by means of said thermographic camera 10. Regarding Jones, Jones does not teach obtaining a

thermal image of the weld let alone obtaining a thermal image as the weld is being formed. One of ordinary skill in the art would not find it desirable to combine the teachings of Jones and Sandvoss.

It is respectfully suggested that the combination of Jones, Sandvoss, and Hashimoto only seems plausible after having the benefit of the Applicants' disclosure, which is impermissible. Jones does not teach obtaining a thermal image of the weld let alone obtaining a thermal image as the weld is being formed. Sandvoss merely discloses the testing of weld seams or weld points after the weld has been formed. Hashimoto discloses a thermal test method for nondestructive inspection of the quality of welds formed by spot welding. Neither Jones, nor Sandvoss, nor Hashimoto disclose or suggest heating the first and second plastic pieces at their location of abutment by directing the laser beam over the path of a weld pool multiple times. Accordingly, it appears the Examiner is using the teachings of the present invention to combine the teachings of Jones, Sandvoss, and Hashimoto. Therefore, in view of the above-mentioned reasons, claim 13 is allowable.


Claims 14-21 and 24, which depend directly or indirectly from claim 13, are allowable as depending from an allowable claim and also for the specific limitations recited therein.

In view of the foregoing, it is respectfully requested that the amendment be entered and the application allowed.

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Please charge any deficiency or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,


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